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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,227	09/06/2005	Ian Edward Day	BTW-092US	2605

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EXAMINER

WONG, ERIC K

ART UNIT	PAPER NUMBER
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2883

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,227	Applicant(s) DAY, IAN EDWARD	
	Examiner Eric Wong	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 19-24 and 27-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 19-24, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>0105</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 6-16, 19-24 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Hewitt et al(reference U; PTO1449; hereinafter Hewitt)

As to claims 1 and 6, Hewitt discloses in figure 1, a semiconductor optical waveguide device, comprising a semiconductor layer having an upper surface, and a lower surface which is defined by a lower confinement layer (SiO₂), the semiconductor layer having formed therein:

- (a) a waveguide;
- (b) at least one recess (cathode or anode portion) adjacent to the waveguide and extending from the upper surface of the semiconductor layer;
- (c) at least one doped region (n⁺ or P⁺ regions), at least part of which is situated between the recess and the lower confinement layer; and
- (d) at least one trench adjacent to the doped region (A or B) and the recess and situated on an opposite side thereof to the waveguide, wherein the trench extends from the upper surface of the semiconductor layer.

As to claim 2, the trench is deeper than the adjacent recess.

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As to claim 3, the recess is spaced apart from the adjacent trench.

As to claim 7, the trench extends to the lower confinement area.

As to claim 8, the waveguide is a rib waveguide (figure 1).

As to claim 9, the semiconductor layer comprises silicon (labeled "silicon" in Figure 1).

As to claims 10-13 the lower confinement layer serves as a confinement layer for either charge carriers or optical modes and comprises silica.

As to claims 14-15, a Silicon substrate is disclosed and labeled in figure 1.

As to claims 16 and 28, two doped regions are disclosed (one n+ and one p+).

As to claim 19, the rib waveguide is doped (p-).

As to claim 20, two trenches are disclosed and reside on opposite sides of the waveguide (A and B).

As to claim 21, both n-doped and p-doped regions are disclosed and labeled in figure 1.

As to claims 22-23, the device is a lateral p-i-n diode (title and figure 1).

As to claim 24, the device acts as a modulator (title).

As to claim 27, recesses are on both sides of the waveguide.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hewitt as applied to claim 1 above.

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Hewitt discloses the invention as claimed including trench and doped regions, however fails to explicitly disclose the removal of the spacing areas as claimed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the recess and trench region and eliminate the area between, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same basic function as before involves only routine skill in the art.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. United States Patent Application Publication 2006/0039666.
- b. United States Patent Application Publication 2005/0123227.
- c. United States Patent Number 6,801,702.
- d. United States Patent Number 7,020,371.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Wong whose telephone number is (571)272-2363. The examiner can normally be reached on Monday through Friday, 830AM - 430PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eric Wong/
Examiner, Art Unit 2883

/Frank G Font/
Supervisory Patent Examiner, Art Unit 2883

March 26, 2008
FGF/ew